
**THIN-FILM LARGE-AREA COHERENT LIGHT SOURCE, FILTER AND
AMPLIFIER APPARATUS AND METHOD**

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ABSTRACT

5 Lasing at the edge of the reflection band or at a defect state within the reflection
band of a thin one-dimensional periodic structure is used to create a large-area, thin-film
laser source with transverse dimensions that can be much greater than the film thickness.
Angular confinement of radiation propagating perpendicular to the layers leads to a
spreading of the beam inside the medium which is much greater than the diffraction
10 divergence. This enhances the spatial extent of correlation at the output surface of the thin
film. When a pump source induces gain at the lasing threshold in a wide region, a
spatially coherent monochromatic light beam is emitted perpendicular to the film surface
from the entire gain region. Alternate embodiments of the present invention include a
passive spatial filter and an active amplifier.

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